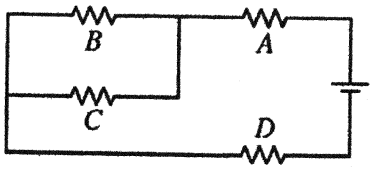
Name _____ Date _____

AP Physics

Period _____ AP Review # 14

Mrs. Nadworny

AP Review # 14



4. (7 points, suggested time 13 minutes)

A circuit contains a battery and four identical resistors arranged as shown in the diagram above.

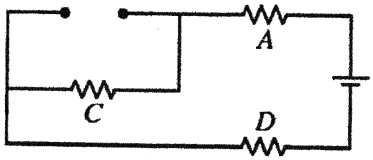
(a) Rank the magnitude of the potential difference across each resistor from greatest to least. If any resistors have potential differences with the same magnitude, state that explicitly. Briefly explain your reasoning.

Ranking: $V_A = V_D > V_B = V_C$

a) (1) A+D in series so same
(1) B+C in ∥ so same
(1) B+C less V b/c less R

Brief explanation: B+C are in parallel, so they have equivalent potential difference. Because they have less total resistance they get less voltage. A+D are identical resistors so they get the same voltage.

Resistor *B* is now removed from the circuit, and there is no connection between the wires that were attached to it. The new circuit diagram is shown below.



(b) When resistor *B* is removed, does the current through resistor *A* increase, decrease, or remain the same?

____ Increase ✓ Decrease ____ Remain the same

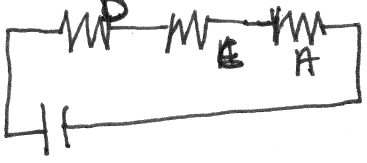
Briefly explain your reasoning.

(c) When resistor *B* is removed, does the current through resistor *C* increase, decrease, or remain the same?

✓ Increase ____ Decrease ____ Remain the same

Briefly explain your reasoning.

b)



(1) R_T ↑
(1) why A ↓

Removing resistor B increases the total resistance of the circuit, which decreases the total current, which is what travels through A.

c) Although the total current decreases, resistor C was splitting the total before and now gets all of I_T, increasing its current.

(1) $I_C = I_T$ now
(1) explain using I or V